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STUDIES IN NORTH AMERICAN AGERIIDAE
(LEPIDOPTERA).

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I.

DESCRIPTIONS AND CORRECTIONS OF SPECIES FROM LONG ISLAND,
NEW YORK.

Preliminary to a critical revision of the Aegeriidae of North America it seems advisable to begin now the publication of a series of papers dealing in the main with investigations on life histories and such field work as will, it is hoped, induce others to assist in solving the many mooted questions still pertaining to this family of moths. Descriptions of new species, unaccompanied by biological data, for the present will be limited to material submitted by friends and correspondents for determination and naming. To all inclined to co-operate in these investigations, a cordial invitation is extended to freely avail themselves of the author's assistance in the identification of specimens or in methods of collecting.

Synanthedon castaneae Busck versus *Synanthedon pictipes* Grote and Robinson.

The recognition by Mr. Busck of *S. castaneae* as a valid species, I dare say, was based not so much upon differences of structures and coloration from those of *S. pictipes* as upon the biological fact that the first species is a breeder in chestnut, *Castanea dentata*, while the latter attacks cherry, peach and plum. For some time, and in spite of Mr. Busck's carefully drawn up description, I failed to separate satisfactorily my rather long series, including

specimens of both species and I felt inclined to agree with earlier investigators that we were dealing with only one species subject to slight variations. Continued critical study of fresh, bred material finally led to the discovery of a dependable character, heretofore overlooked by Mr. Busck and myself, which will serve readily to separate the two species, *viz.*: *S. castaneae* has only one pale yellow annulation on the tibia of the posterior leg located at the tarsal joint; *S. pictipes* has two such annulations, one at the tarsal joint and the other at the second pair of spurs medial to the tibia.

The illustration (plate 31, figure 10) in Beutenmuller's "Monograph of the Sesiidae of N. A." consequently should read *S. castaneae*, female, in place of *S. pictipes*, female.

This species formerly so common is now threatened with extermination should nothing happen to check the steadily advancing destruction of the American chestnut (*Castanea dentata*) due to the chestnut blight.

Synanthedon corni Hy. Edwards.

Examination of the type of *S. corni* discloses that two superficially similar, but biologically widely separated species, have been assembled under one name. The type specimen, captured by Mrs. Hy. Edwards in Purgatory Swamp, Mass., about 1880, was found resting on *Cornus sericea* and, assuming this to be its food-plant, was named *S. corni*, an unfortunate and misleading name, because it is not a breeder in dogwood, but a rootborer of the tall, flat-topped white aster, *Doellongerina umbellata*, which fact, however, was established only in recent years. Subsequent to the description other investigators, including Kellicot, Beutenmuller and the writer, confused with this species, and quite excusably so, another which breeds in the branches of maples, principally red maple, and it is this species, in reality without a name, which has been masquerading as *S. corni* in almost all collections.

While it is quite easy to separate the two species when dealing with fresh, bred material, it is equally easy to confuse them when specimens are flown or discolored by grease, a condition to which *S. corni* is especially subject in spite of precautionary measures which may have been taken. Hy. Edwards' description of *S. corni* (Papilio, Vol. 1, p. 190) answers very well for a specimen rather undersized and somewhat rubbed through flight, but the re-description by Beutenmuller ("Monograph of the Sesiidae of N. A." p. 296) undoubtedly was based upon a specimen of

the red maple borer and this is confirmed by his illustration (plate 31, fig. 17) which is typical of *S. acerrubri*, the species so named hereafter.

Hy. Edwards' description of *S. corni* reads: "Costal and posterior margins of forewings, large discal spot, linear internal margin, and narrow margin of hindwings dull black. Palpi, collar and underside of caudal tuft, bright orange. Pectus and fore femora, pale yellow. Antennae black, fuscous at the apical third. Tibiae and tarsi, blackish without, yellow within. Spurs, pale orange. Thorax and abdomen purplish black, the former with a few lateral hairs, and the latter with a slight golden reflection. No bands. Exp. wings. 15 mm. Type, 1 male."

With well above fifty specimens on hand for comparison, it seems advisable to add the following:

Male: Thorax densely clothed laterally with dull yellow hair. Abdomen black above, not banded, but dusted with pale yellow scales, heaviest on segments 4, 5, 6; below golden yellow. Caudal tuft above orange in center, black at the sides, below entirely bright orange. Legs yellow, shaded with black on tibiae and tarsi.

Alar expanse, average 19 mm.

Female: Antennae black, pale yellow at the apical third. Abdomen above black, but densely shaded with pale yellow scales. Caudal tuft deep orange above and below. Costa of primaries with a scattering of yellow scales, and a yellowish stain between the discal spot and margin of apex. Otherwise like the male.

Alar expanse, 22 mm.

Type, 1 male. *Am. Museum Nat. Hist.*

Habitat. Purgatory Swamp, Mass. (Hy. Edwards), Woodhaven South, Long Island, N. Y. (Engelhardt).

Its distribution should be looked for along the range of its food-plant throughout the Atlantic Coast and Midwestern States.

Foodplant. Bred from the roots and basal parts of stalks of *Doellongeria umbellata* (tall, flat-topped white aster) in late May and early June, 1921. It is a fairly common species along the borders of a swampy region at Woodhaven, L. I. The males fly about actively on bright, sunny mornings, while the more sluggish females resting on or near the foodplant can be taken with a killing bottle. The eggs are laid singly on the stalks of the growing plants ten inches or less above the soil and the young

larva works downward through the pith to the root, attaining full growth in late fall. At this time also preparations are made for the change to pupae in early May by enlarging the larval gallery from the root upward for about two inches, where the stalk is weakened by an inner circular incision and the gallery capped with frass. Just below this incision a round hole leaving only a thin, outward covering of plant tissue permits an easy exit for the emerging imago two or three weeks after pupation. Stalks thus weakened invariably break off at the point of incision during winter storms, leaving a clean-cut, short, upstanding stump, easily recognized by the collector when looking for pupae. Quick action, however, is needed for the pupa is capable of traveling up or down and it will descend well into the root upon disturbance. This provision for movement no doubt is of advantage to the larva and pupa at times when the swamps are flooded. Larvae which have not transformed to pupae by the end of May, experience has shown, invariably have been parasitized by a small ichneumon wasp.

A more natural grouping for *S. corni* would be to place it near *S. bassiformis* and not as has been done with *S. acerni*.

Synanthedon acerrubri new species.

Male: Antennae black, more or less tinged with white or pale yellow before the tip. Palpi orange, black at the tip. Head black, orbits silvery white. Collar orange intermixed with black. Thorax violaceous black above, pale lustrous yellow below; patagia laterally banded with yellow and coxae of forelegs silvery white. Wings transparent; veins, costa, rather broad apical margin of primaries and large discal mark black, apex with violaceous reflection; below same as above, but veins and costa washed with yellow. Abdomen: above steel blue or violaceous, segments 2, 4, 5, 6 narrowly banded whitish or pale yellow; underside segments 2, 4, 5, 6 entirely whitish shading to pale yellow laterally. Anal tuft bright red intermixed with black above, below uniformly bright red, claspers yellow. Legs: outward femora, anterior part of tibiae and tarsi blue-black mixed with yellow scales and tarsi banded yellow at the joints, posterior part of tibiae between the spurs solid blue-black; inward femora, tibiae and tarsi yellow, excepting a blue-black area between the spurs, which are yellow.

Alar expanse, 18 mm.

Female, apical third of antennae prominently shaded with white. Abdominal segments 4, 5, 6 often, but not always, dusted with yellow scales in addition to yellow bands. Anal tuft bright red above and below; otherwise like the male.

Alar expanse, 20 mm.

Habitat. North Atlantic and Midwestern States. Fairly common in the vicinity of New York City and on Long Island.

Type. Described from five males and seven females. Holotype male and Allotype in the author's collection at the Brooklyn Museum. Co-types U. S. Nat. Mus., Am. Mus. Nat. Hist., William Barnes Collection.

Foodplant and habits. Red maple is the foodplant in woodlands and swamps, but other maples planted as shade trees also are attacked. The larva bores under the bark preferring the branches to the tree trunks. Where a larva is working singly the place of infestation is indicated by a slight swelling and a roughening of the bark. Quite often advantage is taken of the ugly scars left from the borings of the leopard moth (*Zeuzera pyrina*) and such scars may shelter six or more larvae, thereby contributing to the killing of the limb. Otherwise the larval habits are much like those of the common maple borer, *S. acerni*. Wintering in its gallery the larva resumes feeding in the spring, changing to pupa within an oblong cocoon of castings and chips during May or June. The adults emerge in June and July. Occasionally a moth may be collected, attracted by light, which, however, does not signify nocturnal habits, but is merely an accident.

The author invites the submission of specimens determined as *S. corni* for verification or correction.

***Synanthedon viburni* new species.**

Male: Antennae black with metallic bluish sheen above. Palpi black above, pale yellow below, excepting the tip which is black. Head black, heavily clothed with bristling hairs forming a pale yellow patch between and in front of the eyes; a narrow pale yellow fringe of stiff hair encircles the head posteriorly. Collar black with steel-blue reflections. Thorax black with cupreous reflections and a pale yellow patch on each side beneath; patagia black, inner margin narrowly bordered with pale yellow. Metathorax dorsally intermixed with yellow. Forewings transparent, veins, mar-

gins and cilia black, costa with few pale yellow scales interspersed, increasing at apex; discal mark rectangular oblong, distinctly black; underside of forewings same as above. Hindwings transparent, veins black, vein A. 2 claviform, broadest at apex. Abdomen black with steel-blue reflections; segment 2 narrowly bordered with pale yellow above; a small, pale yellow patch on each side of segment 4, lateral tufts sparsely intermixed with pale yellow hair. Legs steel-blue; coxae laterally bordered with very pale yellow; femora, tibiae and tarsi banded white at the joints. Spurs white.

Alar expanse, $18\frac{1}{2}$ mm.

Female: Like the male except: antennae prominently pale yellow before the tip, costa and margin of forewings more profusely intermixed with pale yellow scales, patagia broadly bordered with pale yellow, abdominal segment 2 dorsally covered with pale yellow scales to half its width and a scattering of scales of the same color on segment 3.

Alar expanse, 22 mm.

Habitat. Woodhaven South, Long Island, N. Y. IV. 19. 1919, V. 10. 1921. Old Neck Road, Flatbush, Long Island, V. 4. 1919. Brooklyn Botanic Garden, Brooklyn, N. Y. V. 1920.

Foodplant. *Viburnum dentatum* (arrowwood), and on horticultural varieties of *Viburnum*.

Types. Male and female, in the author's collection at the Brooklyn Museum, Co-type male U. S. N. M., Co-type female William Barnes Collection.

Bred from the canes and branches of *Viburnum dentatum* obtained in swampy thickets at Woodhaven, L. I., and from horticultural varieties of *Viburnum* in parks and gardens of Brooklyn. It is an annual species, the larva living under the bark and not in the solid wood, preferably in such parts of the foodplant where abrasions or gall growths have caused distortion and swellings. Pupation takes place in early May in an oblong cocoon of small bits of wood and frass constructed within the sinuous larval gallery under the bark. The moth emerges in late May or early June. While locally not uncommon, the larvae are much subjected to the attacks of an ichneumon and breeding experiments thus far have resulted in more parasites than moths.

In general this species bears a close resemblance to the lesser peach tree borer, *S. pictipes*, and where specimens are flown and rubbed a separation may be difficult. Distinguishing features are the pale yellow fringe encircling the head posteriorly, the

broader margins on the primaries and the brighter steel-blue luster on the abdomen. The prominent white area before the tip of the female antennae, moreover, will readily serve to separate this sex from *S. pictipes* which has unicolorous antennae in both sexes.

The occurrence of *S. viburni* on horticultural shrubs of *Viburnum* gave rise to a consideration of the possibility of dealing with an introduced species. But this possibility appears to be excluded, as it bears no resemblance to *S. andrenaeformis* of Europe, the only other Aegirid recorded as boring in *Viburnum*. Further investigations should prove it an indigenous species of wider distribution than established at present.

II.

DESCRIPTIONS OF TWO NEW WESTERN SPECIES.

Synanthedon albociliata new species.

Male: Antennae lacking, excepting small basal portions which are black. Palpi above black with tips entirely so; below snowy white, this color extending over the coxa and trochanter of the forelegs. Head black, hairy above intermixed with a few white hairs. Collar narrow, dull white. Thorax black with a lateral fringe of coarse, white hair above and of white scales below the base of wings. Abdomen black with a scattering of white scales on the fourth segment dorsally and with the fourth, fifth and sixth segments white ventrally. Anal tuft black above, mixed with sordid white below. Femora and tibiae of hindlegs densely clothed with coarse hair, black and sordid white intermixed; tarsi sordid white. Broad costa, outer and inner margins and large discal mark of forewings deep black, the clear spaces between the veins suffused with white reflections; cilia white. Hindwings transparent with faint reflections of white; veins and narrow margins black, cilia white; underside of forewings heavily shaded with white scales. Alar expanse, 18 mm.

Female: Antennae black with steel blue luster. Thorax with two narrow, lateral stripes, yellowish white. Abdomen black with posterior half of fourth segment yellowish white. Anal tuft, ventral parts of abdomen and hindlegs all black. Forewings heavily shaded with black, streaked with white along the inner margins and before the discal mark. Cilia brownish black. Hindwings transparent between veins and

broad margin which are black. Otherwise like the male. Alar expanse, 20 mm.

Habitat: Kerrville, Texas, October, 1916.

Foodplant and habits not known. Mr. H. Lacey, the collector, since removed from Texas, reported that the specimens were taken among some weeds on his ranch. This, together with the lateness of the season, indicates that the species is a rootborer in some perennial plant, possibly one of the Eupatorieae.

Type, male, allotype, female, and two paratypes, females, William Barnes collection; two paratypes, females, G. P. Engelhardt collection at the Brooklyn Museum.

***Synanthedon auritincta* new species.**

Male: Antennae black with a small white area on upper surface near the tip. Palpi black above, pale yellow below, excepting the third joint which is black. Head black violaceous; front black with a triangular white patch above clypeus and the eyes broadly bordered with white below the antennae. Collar golden yellow above, white at the sides and below. Thorax above black violaceous with two broad lateral stripes and posterior margin golden yellow; below two broad yellow lateral stripes connecting with the stripes above anteriorly but not posteriorly, otherwise white. Coxa and trochanter of forelegs shiny white. Middle and hindlegs outward violaceous black with white annulations at the joints and spurs; inward dusted with white to tibial spurs; spurs white. Forewings transparent, costa, broad apical margin, large discal mark and veins black, slightly violaceous. Cilia dull black. Hindwings transparent, veins black, cilia dull black, gradually shading to white at the base. Under surface of wings same as above, except a yellow dusting on costa and more slightly on apical margin and discal mark. Abdomen violaceous black with a narrow yellow band on segments, 2, 3, 4, 6 and 7. Caudal tuft steel blue, narrowly fringed with white laterally; ventral parts of segments 1 and 2 dusted with white scales which form a narrow band on segments 4 and 5 and lateral spots on segment 7. Alar expanse, 14-15 mm.

Female: Antennae black, usually but not always marked with white near the tip. Palpi golden yellow above, pale yellow to whitish below. Head black violaceous; face black, bordered with white laterally and posteriorly. Collar golden

yellow above, pale yellow or whitish below. Thorax black, heavily shaded with golden yellow laterally, anteriorly and posteriorly; ventral parts also heavily shaded with yellow of a pale hue, sometimes white. Coxa and trochanter of forelegs lustrous yellow or whitish, suggesting a bib. Middle and hindlegs golden yellow, except a violaceous annulation between the spurs of tibia and the tarsus which is violaceous and yellow banded at the joints. Forewings transparent; costa, apical margin, discal mark and veins black violaceous; the space between the veins from apical margin to about half the distance to discal mark heavily shaded with golden yellow, discal mark narrowly bordered outwardly and base shaded prominently with the same color. Hindwings transparent; veins, margins and cilia black, excepting the basal parts which are yellow. Underside of wings with the costa heavily shaded with yellow, otherwise as above. Abdomen violaceous black with narrow golden yellow annulations on all segments, excepting segments 5 and 7 which are all yellow. Ventral parts greatly suffused with yellow but less so on segments 2 and 3. Caudal tuft golden yellow intermixed with black laterally and at base above and below. Alar expanse, average 17 mm.; range 12 to 21 mm.

Habitat: Baboquivari Mts., Pima Co., Arizona, August 1-15, 1923 and 1924. O. C. Poling, collector. Described from eleven specimens, two males and nine females, kindly submitted for determination by Dr. Barnes and Mr. Benjamin. The foodplant and habits are not known.

Type, female, allotype, male, and six paratypes, females, William Barnes collection; one paratype, male and two paratypes, females, Geo. P. Engelhardt collection at the Brooklyn Museum.

The assumption that here a dioecious species is being dealt with is directly supported only by the locality and date which correspond for all the specimens in hand, and therefore is open to doubt. Nevertheless so many western species follow along the lines of sexual divergence as do the present examples that it seems preferable to err on the side of conservatism rather than to add to a nomenclature already overburdened with synonymy. The name "*auritincta*" has been suggested by the rich golden luster on the primaries and on the abdominal bands of the females, which should serve to separate readily this species from all others. The arrangement of the abdominal bands of the males also is distinctive, though less easily recognized, especially where specimens are rubbed or discolored.